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TRANSLATION OF

THE PROBLEM OF SELECTING A RADAR TRANSMITTER FOR RADAR OBSERVATION OF METEOR TRAILS

(K voprosu o vybore peredatchika radiolokatsionnoi stantsii dlia radioissledovaniia meteornykh sledov)

by

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THE PROBLEM OF SELECTING A RADAR TRANSMITTER FOR RADAR OBSERVATION OF METEOR TRAILS

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In recent years, radar studies of meteor trails have been widely developed. These studies are, for the most part, carried out with the aid of radar stations on wave lengths of 1.5 ÷ 12 m.

An impulse autogenerator* is the basic type of transmitter used at radar stations operating on a meter-frequency. Autogenerators have been used extensively because of their simple construction and operation. The parameters of several transmitters are given in the following table:

No. p.	No. p.	wave length (m)	pulse output (kvt)	pulse duration (msec)	frequency rate (im/sec)	investigator
1		4.1	80	10	50	B. Iu. Levin P. O. Chechik
2		5.0	100	8	150	Clegg
3		8.4	150	3	150	Greenhow

However, with all their advantages, autogenerators have many serious disadvantages. Insufficiently high frequency stability is one of the major disadvantages. Complete frequency instability is determined both by the accuracy of the regulated frequency in time and by the accuracy of the regulation of the required frequency.

The relative effective error of the frequency regulation due to the inaccurate regulation of the short circuiting connector, and due to the errors of the frequency meter and the presence of a frequency spectrum under actual conditions, is about 0.5% [1].

Even in a high frequency impulse [2], there is no autogenerator constant frequency.

The reasons given make it difficult to use an autogenerator as a radar station transmitter when using the coherent-impulse method of measuring the

* Exact translation unknown.

drift rate of meteor trails and in a number of other methods when an increased frequency stability is required of the transmitter [3].

A serious deficiency of an autogenerator working in an impulse regime is the unstable front lag of the high frequency impulse [4].

Depending on the circuit and the working conditions of the autogenerator when feeding the modulating voltage, autofluctuations arise either from the impact fluctuations in the circuit or due to electrical fluctuations [5].

When starting the autogenerator with noise voltage, the regulation time during the impulse operation will fluctuate around its most probable value.

The presence of a non-stationary lag of the high frequency impulse which is relatively modulating makes the autogenerator unsuitable for use at radar stations which measure the drift rate of meteor trails.

Such instability can be eliminated, for example, by using a high frequency autogenerator [4]. When planning transmitters for new meteor radar stations, we should consider the inadequacies mentioned of the autogenerator, and take measures necessary to eliminate them.

In this case, the most rational measure would be the construction of a transmitter according to a multi-cascade scheme with a quartz stabilizer and a complicated modulation scheme. This will make it possible to eliminate all the above mentioned deficiencies in the transmitters of meteor radar stations which are now in use.

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